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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* NICOLAS ECHEs and JEAN-PAUL FAUCHON

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Appeal 2009-002937  
Application 10/626,555  
Technology Center 3600

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Decided: September 24, 2009

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Before WILLIAM F. PATE, III, STEFAN STAICOVICI, and  
KEN B. BARRETT, *Administrative Patent Judges*.

BARRETT, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Nicolas Eches and Jean-Paul Fauchon (Appellants) seek our review under 35 U.S.C. § 134 of the final rejection of claims 1-8. We have jurisdiction under 35 U.S.C. § 6(b).

An oral hearing was held on September 15, 2009.

## SUMMARY OF THE DECISION

We AFFIRM.

### THE INVENTION

Appellants' claimed invention pertains to a sub-caliber projectile comprised of a calibered sabot having two or more segments and surrounding a sub-caliber penetrator. Spec. 1, ll. 6-8. Claim 1, reproduced below, is representative of the subject matter on appeal.

1. A sub-caliber projectile comprising:

a sub-caliber penetrator having a caliber less than a caliber of a gun barrel for firing the penetrator, said penetrator having a lengthwise central axis;

a sabot dimensioned to have a caliber substantially equal a gun barrel caliber and comprising at least two segments and surrounding said sub-caliber penetrator, wherein each segment comprises:

a rear support seat comprising radial studs of substantially full gun barrel caliber located at a rear end of said segment;

a median support seat including a push plate of substantially full gun barrel caliber located near the center of gravity of said sub-caliber projectile; and

a forward support seat having radial arms of substantially full gun barrel caliber located at a front end of said segment in front of said median support seat, wherein said segment has a sub-caliber radial extent of some axial length between said median support seat and said forward support seat.

## THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Bisping	US 4,524,695	Jun. 25, 1985
Sippel	US 5,289,777	Mar. 1, 1994
Wilkerson <sup>1</sup>	US 5,313,889	May 24, 1994

The following Examiner's rejections are before us for review:

1. Claims 1, 3, 7, and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sippel and Bisping;
2. Claims 2, 4, and 5 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sippel, Bisping, "and further in view of established case law" (Ans. 5); and
3. Claim 6 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Sippel, Bisping, "case law as applied to claims 1, 4 and 5" (Ans. 6), and Wilkerson.

## ISSUES

As to claim 1, the Examiner found that Sippel discloses a sub-caliber penetrator with a sabot having forward and median support seats, and that Bisping discloses a sabot having a rear support seat. Ans. 3-4. The Examiner concluded that it would have been obvious to provide Sippel's sabot with Bisping's rear support seat. *Id.* at 5. Appellants argue that there is no suggestion or motivation from the prior art to combine the references,

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<sup>1</sup> Although the Examiner failed to identify the Wilkerson reference in the Evidence Relied Upon section of the Answer, that reference is identified in the statement of a rejection, Ans. 6, and Appellants recognize the Examiner's reliance on it, App. Br. 5, 10.

and that the rejection is based on improper hindsight. App. Br. 7. Thus, the first issue on appeal is:

Have Appellants shown that the Examiner failed to articulate reasoning with some rational underpinning sufficient to support the conclusion that one of ordinary skill in the art would have had reason to combine the references so as to arrive at a projectile having three support seats?

As to the rejection of claims 2, 4, and 5 (which depends from claim 4, and therefore includes the limitations thereof), the Examiner concluded that the specific dimensions recited in claims 2 and 4 would have been obvious because the discovery of the optimum values of such dimensions involves only routine skill in the art. *See Ans. 5-6* (citing *In re Boesch*, 617 F.2d 272 (CCPA 1980)). The Examiner also found that the dimensions were not disclosed as being critical to Appellants' invention. Ans. 6. Appellants argue that the claimed three-support seat sabot structure was unknown, so the recited dimensions could not have been obvious as the discovery of optimum values of a result effective variable in a known structure. App. Br. 9. Thus, the second issue on appeal is:

Have Appellants shown that the Examiner, in rejecting claims 2, 4, and 5 as obvious, erred because the recited values were not variables in a known structure?

## FINDINGS OF FACT

We find that the following enumerated findings are supported by at least a preponderance of the evidence.

1. Figure 1 of Sippel is reproduced below:

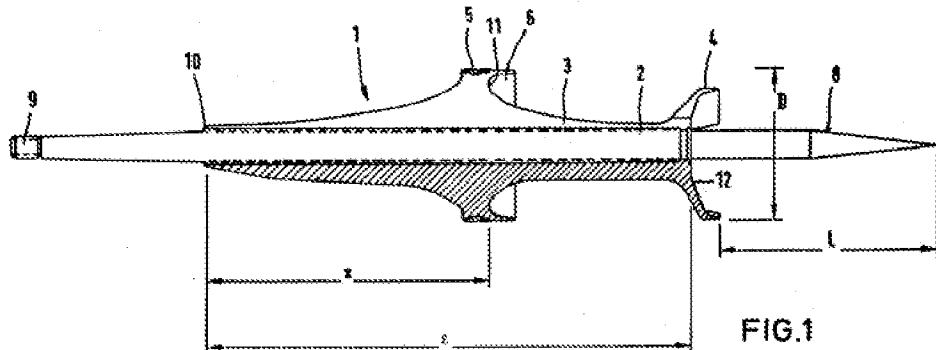
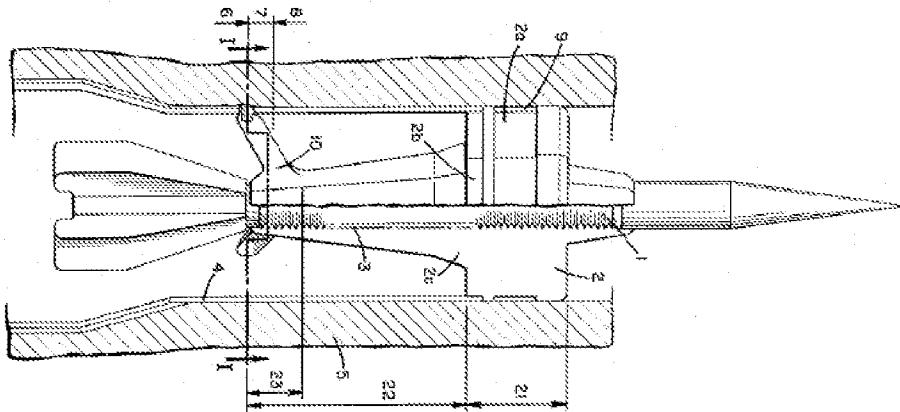


Figure 1 depicts a kinetic energy projectile. Sippel, col. 3, ll. 5-6.

2. Sippel discloses a sub-caliber projectile 1 comprising a penetrator 2 and a segmented sabot 3. Sippel, col. 2, ll. 3-7; col. 3, ll. 23-27. The sabot has a first full-caliber support 4 at its front and a second full-caliber support 5 at a distance behind the first. *Id.*, col. 2, ll. 7-10; col. 3, ll. 27-30. Sippel's Figure 1 depicts the second support located near the middle, lengthwise, of the sabot. Sippel also teaches that persons of ordinary skill in the art were concerned with the relative axial locations of the projectile components. *See, e.g., id.*, col. 2, ll. 14-22.

3. Figure 1a of Bisping, rotated ninety degrees, is reproduced below:



4. Bisping discloses an antitank weapon comprising a sub-caliber finned kinetic-energy projectile 1 and a launching shoe 2 consisting of three shells 2a, 3b, and 2c. Bisping, col. 1, ll. 6-8; col. 3, ll. 4-6. The shoe comprises a full caliber thrust plate 21 and a tubular portion 22 on which three fins 10 are attached. *Id.*, col. 3, ll. 21-23. Bisping's Figure 1 depicts the thrust plate 21 located near the middle, lengthwise, of the projectile, and fins 10 near the rear end of the shoe. The thrust plate and the fins support the projectile in the barrel. *See id.*, col. 2, ll. 1-3; fig. 1. The ends of the fins have pins 11 which hold the projectile firmly in the case 4 within the barrel. *Id.*, col. 3, ll. 27-30; col. 3, ll. 45-51; figs. 1a, 1b.

5. During operation of the Bisping device, the propulsion charge is initiated, causing an increase in the pressure within the chamber. *See* Bisping, col. 4, ll. 31-33. The projectile is held stationary against that pressure by the pins on the fins. *Id.*, col. 4, ll. 33-36. When the forcing pressure is reached, the pins deform and the projectile is released. *Id.*, col. 4, ll. 37-40. The guidance of the projectile in the tube is provided by the thrust plate and the pins on the fins. *Id.*, col. 4, ll. 40-41. Bisping explains that the use of the pins on the fins make it possible to obtain constant forcing pressures. *Id.*, col. 4, ll. 6-14.

6. Bisping also teaches that the disclosed projectile configuration offers numerous advantages such as making it possible, via the fins, favorably to displace the forces caused by the movement of the gun tube, thus decreasing the disturbances on the projectile and reducing fire dispersion. *Id.*, col. 4, ll. 42-47. Also, the arrangement of the fins and pins at the rear of the shoe makes it possible to displace the thrust plate towards the front of the projectile, which increases the propulsive charge volume,

thereby substantially improving the performance of this type of projectile.

*Id.*, col. 4, ll. 47-54. The thrust plate and the pins/fins assure the precise guidance of the projectile during the barrel phase, assuring its stability and contributing to the improvement in the precision of firing. *Id.*, col. 2, ll. 8-12; col. 4, ll. 37-41.

7. The prior art of record indicates that the person of ordinary skill in the art of sub-caliber projectiles had a high level of skill. *See, e.g.*, Sippel, col. 1, ll. 12-55.

## PRINCIPLES OF LAW

“Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103). Rejections on obviousness grounds must be supported by “some articulated reasoning with some rational underpinning” to combine the known elements in the manner required in the claim at issue. *Id.* at 418. However, “the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.*

In *In re Aller*, 220 F.2d 454, 456 (CCPA 1955), the Court of Customs and Patent Appeals “set out the rule that the discovery of an optimum value of a variable in a known process is normally obvious.” *In re Antonie*, 559

F.2d 618, 620 (CCPA 1977); *see also In re Boesch*, 617 F.2d 272, 276 (CCPA 1980).

## ANALYSIS

*The rejection of claims 1, 3, 7, and 8 under 35 U.S.C. § 103(a) as being unpatentable over Sippel and Bisping*

Appellants argue the rejected claims as a group. App. Br. 5, 8. We select claim 1 as the representative claim, and claims 3, 7, and 8 stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(vii) (2009).

Claim 1 recites a projectile having a sabot with rear, median, and forward support seats. Sippel discloses a projectile with median and forward support seats. Facts 1, 2. Bisping discloses a projectile with rear and median support seats. Facts 3, 4. The Examiner reasons that a suggestion and motivation to apply Bisping's rear seat to Sippel's projectile would be "to allow for a practically constant compressive pressure and assure a proper guidance of the projectile during the barrel phase." Ans. 5; *see also* Fact 5. The Examiner also notes that Bisping teaches other advantages of Bisping's rear fin/pin configuration such as decreasing disturbances on the projectile and improving projectile performance. *Id.* at 10; *see also* Fact 6. The Examiner has set forth a reasonable rationale underlying the conclusion of obviousness. Therefore, we determine that the Examiner did not rely on impermissible hindsight, as Appellants urge (App. Br. 7), but rather relied on the knowledge of those skilled in the art at the time of the invention.

Appellants argue that there is no suggestion or motivation from the prior art to combine the references. App. Br. 7-8, Reply Br. 2. We are not persuaded by this argument. The Supreme Court has rejected the rigid requirement of a teaching, suggestion or motivation to combine known

elements in order to show obviousness. *KSR Int'l Co.*, 550 U.S. at 418-19. The Court noted that an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *Id.* at 418. Further, the Examiner’s reasoning is drawn directly from Bisping’s teachings of the advantages of the rear seat configuration. *See* Facts 5, 6. Thus, contrary to Appellants’ assertions, Bisping provides a suggestion to use a rear seat on a sub-caliber projectile.

Appellants have not shown error in the Examiner’s rejection of claims 1, 3, 7, and 8 as obvious over Sippel and Bisping, and we affirm that rejection.

*The rejection of claims 2, 4, and 5 under 35 U.S.C. § 103(a) as being unpatentable over Sippel, Bisping, “and further in view of established case law”*

Appellants’ argument for the patentability of claims 2, 4, and 5 is that the recited dimensions could not have been the discovery of optimum values of variables in a known structure because the three-support seat sabot was not a known structure. App. Br. 9. Thus, Appellants argue, the dimensions “were unknown to a further degree” than the unknown three-support sabot. *Id.* (emphasis omitted). We do not find this argument persuasive.

Claim 2 recites that the axial distance between the rear and forward support seats is not less than three times the barrel caliber. The distance between the two furthest apart supports is termed the guidance length. Spec. 5, ll. 32-33. While Appellants are correct that the three-support sabot is not disclosed in either Sippel or Bisping, both of those references disclose

projectiles with two supports, and therefore disclose projectiles having guidance lengths (the distance between supports). Facts 1-4; *cf.* Spec. 5, ll. 8-11 (discussing the guidance lengths of two prior art configurations). Appellants do not assert that the recited dimension is critical to the invention. *See* App. Br. 8. Rather, the Specification suggests that a guidance length greater than or equal to three calibers is merely the natural result of having three supports. *See* Spec. 5, ll. 32-35; *see also id.* at 5, ll. 8-11 (stating that a two-support prior art configuration had a guidance length of 2.5 calibers). Thus, it seems that the modified Sippel projectile with three supports would have the recited guidance length. Further, one of ordinary skill in the sub-caliber projectile art would have had a high level of skill, and the two references indicate that such a person was concerned with improved guidance within the barrel and with the relative axial location of the projectile components. *See* Facts 2, 6, 7. Accordingly, the discovery of the optimum guidance length was within the skill of the ordinary artisan.

Claim 4 recites that the axial distance between the push plate and the projectile's center of gravity is between 0.5 and 1.5 times the barrel caliber. Bisping's projectile has a push plate (thrust plate 21) and, inherently, a center of gravity. Bisping further indicates that persons of ordinary skill were concerned with the axial position of the thrust plate. *See* Fact 6. Such persons also would be keenly aware of the location of the projectile's center of gravity. The discovery of the optimum push plate to center of gravity distance was within the skill of the ordinary artisan.

While the three-support projectile configuration is not disclosed in the cited references, the structure components defining the guidance length and the distance between the push plate and the center of gravity were not

unknown structures. Appellants have not persuaded us that the Examiner erred in concluding that the dimensions recited in claims 2 and 4 would have been obvious as optimization involving only routine skill in the art.

We affirm the rejection of claims 2 and 4, as well as the rejection of claim 5 (which depends from claim 4, and for which Appellants do not offer separate arguments as to patentability).

*The rejection of claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Sippel, Bisping, “case law as applied to claims 1, 4 and 5,” and Wilkerson*

As to claim 6, Appellants reiterate their previous arguments, made in the context of the first rejection, that neither Sippel nor Bisping provide a suggestion to combine the references, and further assert that Wilkerson also does not provide such a suggestion. *See* App. Br. 10. We have determined that the underlying rejection based on Sippel and Bisping is sound, and therefore there is no need for Wilkerson to cure any purported deficiency. Appellants offer no separate arguments for the patentability of claim 6. *See* App. Br. 10. As such, we are not persuaded of error in the rejection of that claim.

## CONCLUSIONS

Appellants have not shown that the Examiner failed to articulate reasoning with some rational underpinning sufficient to support the conclusion that one of ordinary skill in the art would have had reason to combine Sippel and Bisping so as to arrive at a projectile having three support seats.

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Appellants also have not shown that the Examiner, in rejecting claims 2, 4, and 5 as obvious, erred because the recited values were not variables in a known structure.

## DECISION

The decision of the Examiner to reject claims 1-8 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv) (2007).

AFFIRMED

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